CASE REPORT

Bilateral simultaneous proximal femoral fractures on dissimilar anatomical regions

Pamela Zace[1,*], Alastair Stephens[2], Antonios Konstantinidis[3], Manoj Kumar[4], Ibrahim Inzarul Haq[4], Anca Duca[4], Asterios Dramis[4]

[1]Trauma and Orthopaedics Department, NHS Greater Glasgow and Clyde, Glasgow, UK. [2]Trauma and Orthopaedics Department, University Hospital Coventry and Warwickshire, Coventry, UK. [3]Trauma and Orthopaedics Department, 424 General Military Training Hospital, Thessaloniki, Greece. [4]Trauma and Orthopaedics Department, George Eliot Hospital NHS Trust, Nuneaton, UK.

*Correspondence: Pamela Zace, Forth Valley Royal Hospital, Stirling Road, Larbert FK5 4WR, UK. Email: pamela.zace@nhs.scot

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ABSTRACT

Simultaneous presentation of bilateral proximal femoral fractures following a traumatic event are considered very rare injuries. A literature search revealed that the fracture pattern in bilateral simultaneous proximal femoral fractures is most commonly similar to the anatomical region. We report a case of traumatic bilateral proximal femoral fractures with dissimilar pattern and anatomical location following a low energy trauma. A 90-year-old female presented with a right extracapsular - intertrochanteric neck of femur fracture and a left intracapsular - subcapital neck of femur fracture following a fall. The surgical plan was to fix the right side with a dynamic hip screw (DHS), directly followed by left cemented hip hemiarthroplasty on the left. Anesthetic concerns were raised towards the end of the first procedure hence the hemiarthroplasty was postponed. Following medical optimization, a bipolar cemented hip hemiarthroplasty was performed 4 days later. The patient was discharged after 16 days with carers support at home. Careful planning should take place in cases of simultaneous bilateral hip fracture given increased morbidity and mortality. Operation of both sides in a single stage is acceptable to reduce the risk of anesthetic complications and reduce costs. Dissimilar or asymmetrical bilateral hip fractures present a unique challenge, primarily because of the need to change the patient's position. Communication between the surgical and the anesthetic team throughout any procedure is important, but even more so in high-risk cases. To our knowledge, dissimilar or asymmetrical bilateral proximal hip fractures in the elderly presenting simultaneously have only been described twice in literature. Their rarity necessitates careful preoperative planning. The aim should be to address both injuries in a single operation, however contingency planning is important.

KEYWORDS: bilateral proximal femur fractures; simultaneous proximal femur fractures; asymmetric proximal femur fractures; intertrochanteric fracture; subcapital hip fracture

INTRODUCTION

Hip fractures are one of the most common injuries among the elderly [1] The fracture pattern and surgical options have been extensively described in literature over the years [2]. Simultaneous presentation of bilateral proximal femoral fractures following a traumatic event are considered very rare injuries. The first case was reported in 1941 by Cassell and Cassell [3]. These are more frequent in the younger population, associated with seizures [4], the use of bisphosphonates [5], high energy trauma [6] or metabolic disorders [7], whilst in the elderly they are associated with osteoporosis [8]. The fracture pattern noted in simultaneous bilateral proximal femoral fractures most commonly occurs in similar anatomical regions (intracapsular or extracapsular) [8]. This is thought to be due to the gait and bone architecture as well as the mechanism of injury, i.e. spontaneous fracture on one side leading to a fall on the contralateral side [8].

We report a rare case of traumatic bilateral proximal femur fractures with dissimilar pattern and anatomical location following a low energy trauma.

CASE PRESENTATION

An elderly female was brought to the local trauma unit by ambulance following a fall. She was assessed in the Emergency Department and found to be confused with left leg pain. Her next of kin reported losing phone connection with the patient earlier that day so attended the patient's home where they found her on the floor. The patient's medical comorbidities involved chronic kidney diseases Stage 3 and atrial fibrillation for which she was on Aspirin. She lived alone, walked with a zimmer frame and was usually independent.

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The patient was initially assessed and managed using the ATLS protocol, which included resuscitation with blood transfusion, intravenous fluids, and antibiotics for a urinary tract infection. Focused examination of her lower limbs revealed both left and right hip pain, with a small bruise noted on the right side. Her abbreviated mental test Score was 0/10. The patient had pelvic and hip x-rays, which confirmed a right extracapsular proximal femoral fracture (intertrochanteric) and a left intracapsular proximal femoral fracture (subcapital) (Figure 1). A non-contrast CT scan was performed to further assess the pattern of the fractures. Both hip fractures were acute and an undisplaced greater trochanter fracture on the left side was also noted.

The surgical plan was to fix the right side with a dynamic hip screw (DHS), directly followed by left cemented hip hemiarthroplasty on the left. The patient was medically

Fig. 1. Pelvis X-Ray showing right intertrochanteric neck of femur fracture and left subcapital neck of femur fracture.

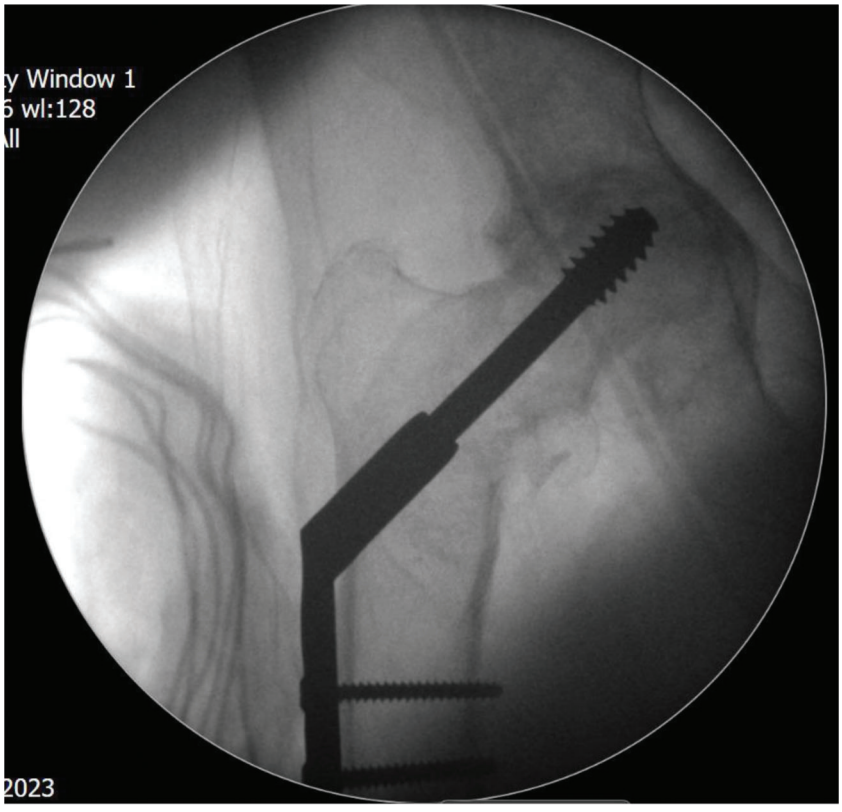

Fig. 2. A 4-hole DHS 135 standard barrel performed for the right intertrochanteric hip fracture (intraoperative anteroposterior view image intensifier).

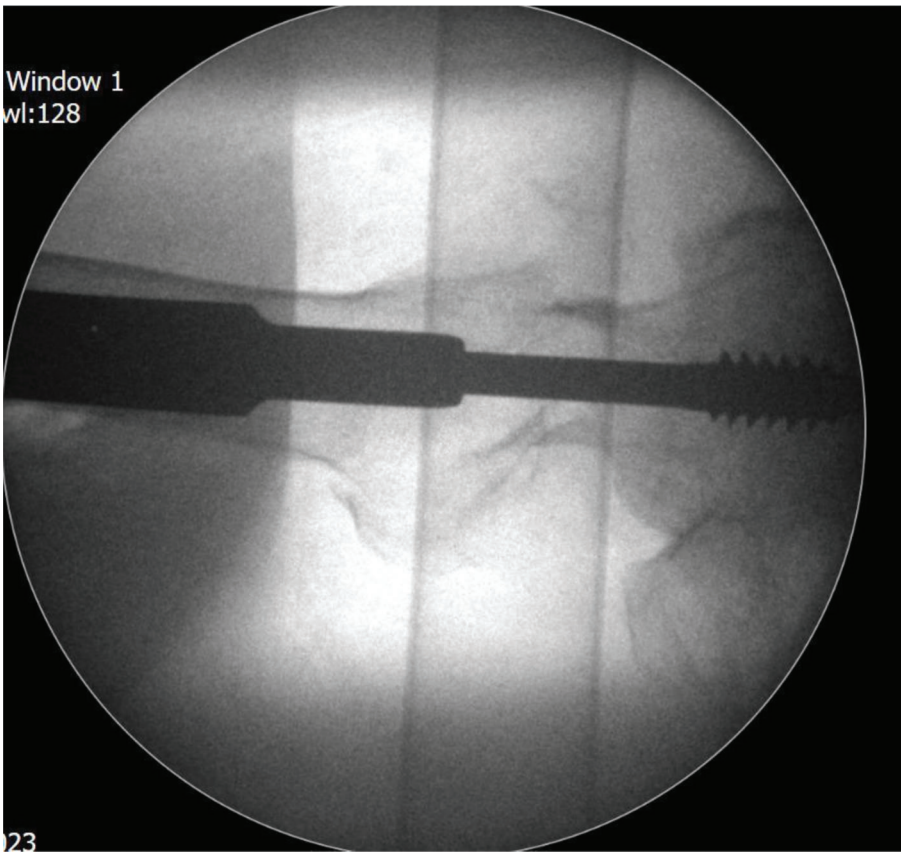

Fig. 3. A 4-hole DHS 135 standard barrel performed for the right intertrochanteric fracture (intraoperative lateral view image intensifier).

optimized for surgery after 48 hours through a multidisciplinary approach involving the orthopedic team, the orthogeriatric team and the anesthetic team. The patient was put on the traction table, and closed reduction was achieved under image intensifier. A 4-hole dynamic hip screw (DHS 135 standard barrel) was performed over 45 minutes. (Figures 2 and 3) Anesthetic concerns were raised towards the end of this procedure as the patient had become hemodynamically unstable. More specifically, during the right hip fixation surgery the patient became hemodynamically unstable as the hemoglobin dropped to 65g/L and the anesthetic team were very concerned of an imminent cardiac arrest.

A joint decision amongst the orthopedic surgeons and anesthetic team was made to postpone the second procedure on the left side until the patient was medically stable.

A multidisciplinary team approach was followed again to medically optimize the patient, she received blood transfusion, intravenous fluids and continued the antibiotic treatment for the urinary tract infection. She returned to the operating theater 4 days later. The patient was positioned in the lateral decubitus position and a direct lateral approach to the left hip was performed. Attempts to fix the greater trochanter fracture with a cable failed due to significant comminution and osteoporotic bone, hence it was repaired with transosseous sutures. A bipolar cemented hip hemiarthroplasty was then performed, which was stable with no impingement. (Figure 4) The patient had an uneventful recovery and was transferred back to the ward. (Figure 5).

The patient was discharged 16 days later with carers support at home. Her mobility on discharge was hoisted for transfer. On a follow up telephone consultation 3 months later, the patient reported improved mobility, she was walking with a zimmer frame, her cognitive function was back to baseline.

DISCUSSION

Hip fractures represent a major public health concern worldwide due to their high incidence, mainly in the elderly population [8]. Often these patients are frail with multiple comorbidities with a hip fracture being the result of low energy trauma. A multidisciplinary approach is advised to manage acute medical issues and rapidly optimize patient's fitness for surgery [9], aiming for surgical intervention within 36 hours as per the UK National Institute for Health and Care Excellence (NICE) guidelines and the best practice tariff (BPT) for fragility hip fracture care by the National Hip Fracture Database (NHFD) [9,10]. However, careful planning should take place in cases of simultaneous bilateral hip fracture given increased morbidity and mortality. In our unit, a trauma multidisciplinary meeting takes place daily to ensure the correct surgical procedure is decided for each patient. For the left hip a cemented hip hemiarthroplasty was decided as being the best surgical plan. On the right side, the intertrochanteric fracture pattern was amenable to fixation with a dynamic sip screw. Despite the incidental finding of osteoarthritis on this patient's right hip, the consensus was to

address the acute fracture first and the hip osteoarthritis could be managed in the elective pathway if the patient wished any time in the future after full recovery of the bilateral hip fractures achieved.

Fig. 4. A bipolar cemented hip hemiarthroplasty was performed for the Left subcapital neck of femur fracture.

An acceptable approach involves operation of both sides in a single stage in order to reduce the risk of anesthetic complications and reduce costs [11].

Most cases described in literature involve symmetrical fracture patterns, which has been attributed to the proximal femur bone architecture, the patient's gait, and mechanism of injury (8). These receive the same treatment bilaterally; reduction and fixation for extracapsular fractures, and arthroplasty for intracapsular fractures.

Following a search on PubMed® National Library of Medicine using the keywords ''hip fractures'' AND ''asymmetric'' AND ''dissimilar'' AND ''simultaneous'' 13 results were noted. Eleven publications were eliminated due to lack of correlation with bilateral proximal femoral fractures. One publication described the presence of an intertrochanteric fracture with a contralateral old neck of femur fracture which were managed surgically on the same session [12]. Efremov et al. described a case of bilateral hip fractures presenting simultaneously in an elderly patient [8]. A publication from 1963 is cited in this paper, presenting the first ever documented simultaneous bilateral neck of femur fractures [13]. In both, surgical management was performed in a single setting. However, in our case, we had to stop after the fixation of the right hip, due to anesthetic concerns regarding intra-operative anemia and the risk of cardiac arrest and thus the hemiarthroplasty was performed at a second stage.

In 2020, the Association of Anesthetists updated the guidelines for the management of hip fractures [14]. According to these, surgery for management of a hip fracture should not be delayed in patients taking aspirin and the presence of a urinary tract infection is not a contra-indication to proceed [14]. As per the latest UK NICE guidelines on management of hip fractures, surgery should be performed on the day of or the day after admission [9].

Asymmetrical or dissimilar bilateral hip fractures present a unique challenge, primarily because of the need to change the patient's position intraoperatively [13]. Fixation is opted to be performed first to reduce the risk of prosthetic

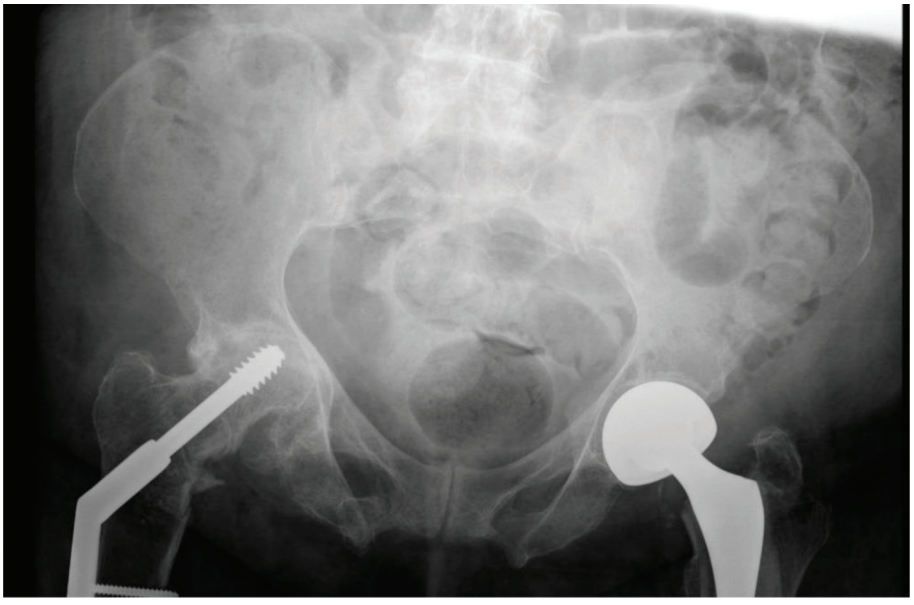

Fig. 5. Post-operative X-Ray of the pelvis showing DHS fixation on the Right side and Bipolar hip hemiarthroplasty on the Left side.

dislocation, particularly when positioning the contralateral leg up in the holder [13]. Adaptations might be required to facilitate quick patient's positioning, such as direct anterior hip approach for hemiarthroplasty compared to the usual lateral or posterolateral approach [13]. Communication between the surgical and the anesthetic team throughout any procedure is important, but even more so in high-risk cases. Close post-operative monitoring is crucial due to the high risk of acute renal and cardiac injury, and general deterioration secondary to increased blood loss and prolonged anesthetic time compared to a unilateral hip fracture case. Rehabilitation is also more challenging as both lower limbs will suffer long term impairment. Enhanced physiotherapy is advised to achieve early mobilization post-operatively.

Routine orthopedic follow up with serial plain radiographs and hip outcome scores is not part of a routine clinical practice for elderly patients with proximal femoral fractures in the UK. Should there be any concerns raised from the general practitioner or the physiotherapy team in the community, the patients are referred back to the emergency department or outpatient clinic for further review. The patient presented in our case recovered well and reached her mobility baseline hence no further routine follow up was required. Further review of the patient's electronic records 12 months following the index procedure, revealed no further surgical interventions recorded at a regional level with regards to the bilateral proximal femoral operations, despite the mild degree of superior positioning of the lag screw in the right femoral head and the small degree of varus positioning of the femoral stem on the left side.

CONCLUSIONS

Simultaneous bilateral proximal femoral fractures can be operated in a single stage to reduce the risk of anesthetic complications and reduce costs, however contingency planning is important due to the increased operating time and its associated intra-operative risks. Dissimilar bilateral hip fractures present a unique challenge, primarily because of the need to change the patient's position intraoperatively. Fixation is opted to be performed first to reduce the risk of prosthetic dislocation. Close post-operative monitoring and rehabilitation is crucial due to the higher risk of complications compared to a unilateral hip fracture case.

Conflict of Interest

Nothing to declare.

Informed consent

Written informed consent was obtained from the patient for publication of this case report.

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